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JOHN C.
ERNST LLC
PROCESS OBSERVATION SOLUTIONS

SIGHT FLOW INDICATORS

INSTALLATION, OPERATION & MAINTENANCE MANUAL
FOR SERIES: **S12**



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PRODUCT QUICK SPECS.

NPT Size	Material	Standard Gasket	Ratings	
			Standard	ASME
1/2"-2"	Carbon Steel	Neoprene	150 PSIG @ 250°F	285 PSIG @ 100°F 245 PSIG @ 250°F
1/2"-2"	Bronze	Neoprene	150 PSI @ 250°F	225 PSIG @ 100°F 195 PSIG @ 250°F
1/2"-2"	316SS	Gylon® 3545	150 PSI @ 450°F	275 PSIG @ 100°F 170 PSIG @ 500°F

Limited to Glass & Gasket Ratings

I. INTRODUCTION

This manual has been prepared as a guide for personnel responsible for installation and maintenance of these items. All instructions must be read and understood thoroughly before attempting any installation, operation and maintenance.

John C. Ernst Threaded Sight Flow Indicators have been designed to allow the visibility of process media as they pass through enclosed pipelines. The unit creates a view-port to the fluid process so flow volumes, directions, and reactions can be observed without interrupting process flow. The process flow stream can be monitored in different orientations with a variety of indication devices. Please contact our sales department if assistance is needed in choosing a unit specific for your application.

With the appropriate indication type, these Sight Flow Indicators can allow for monitoring of:

- Flow Direction
- Flow Speed
- Media Color & Clarity
- Foam Presence
- Air/Bubble Presence

These Sight Flow Indicators consist of 5 primary components. The materials of each component will vary based on the characteristics of the application(s). If additional information on the materials is needed, see the Spare Parts section, or contact the John C. Ernst Sales Department.

- **Body:** This provides rigid in-line attachment capability for the Sight Flow Indicator. Each viewing end of body has a flat, machined cavity in which the retaining ring compresses critical components.

- **Gaskets:** These will tightly seal between the glass and the body.
- **Glass Discs:** These are installed over the gaskets to provide the window for observation of the media passing through the body. A glass cushion (typically a fiber material) is laid on the other side to prevent the retaining ring from damaging the glass surface.
- **Retaining Rings:** These threaded rings retain the above components by screwing into the corresponding threads in the body. They will be pre-torqued in accordance with the values found on Page 2.
- **Indication Type:** If requested, this will allow assistance in viewing flow speeds, particularly with clear medias. Indicators are mounted within the body, independent of the glass, gaskets and rings.

⚠ WARNINGS

Failure to follow instructions could result in a malfunction or breakage of the indicator, resulting in fluid escaping from the unit and fragmenting glass.

Always wear safety glasses when installing, servicing or operating sight flow indicators.

Failure to follow precautions can result in personal injury and property damage.

⚠ WARNING

Exceeding the design ratings or application's data limits can cause the glass to break, the unit to leak, or sudden release of pressure. Failure to keep operations below design ratings may result in serious personal injury and property damage.

II. INSPECTION

Receiving Inspection

Upon receipt of the sight flow indicator, check all components carefully to ensure that damage did not occur. If damage is evident or suspected, do not attempt installation.

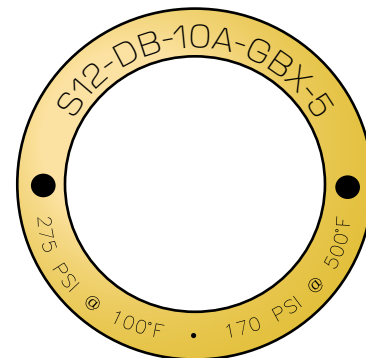
End User's Rating Inspection

Prior to installation the user(s) must confirm that:

1. The user's purchase order, Product Quick Specs, and the John C. Ernst Technical Drawing, all pertain to the ratings stamped along the bottom of the retaining ring as shown in **FIGURE 1**.
2. The glass lenses are free of scratches, chips or other imperfections.
3. The connections and inside of the unit are clean and free of any foreign material.

4. The materials of construction are chemically compatible with both the media(s) and unit's surrounding environment.

Figure 1 (Sample Only)



⚠ **WARNING:** Cancer and Reproductive Harm - www.P65Warnings.ca.gov

III. INSTALLATION

Installation Precautions

DO NOT impose system piping loads on the Sight Flow Indicator. It is not designed to be a load bearing component. Piping must be supported and aligned with the sight flow indicator end connections to reduce any bending or torsional stresses. Install the Sight Flow Indicator:

- Away from areas where objects may be dropped or thrown.
- So that it is protected from dust, grit, and other objects that could damage the glass.
- So it is protected from external thermal shock. This could be a high a temperature application being exposed to a cold air blast or cold water wash.

Retaining Ring Torque Check

Retaining Ring torque is crucial to the proper operation of this unit, and safety of the operator. With a torque wrench and a John C. Ernst **873-SOCKET** spanner tool this should be checked after initial installation, and periodically thereafter to ensure your operator's safety and media's containment.

Orientation

The following chart depicts the recommended unit orientation of each indication type. Not complying with this information can cause additional stress on the unit's internal components, excess back pressure in the pipe line, and incorrect or misleading visual observation.

Indication Type	Orientation	Flow Direction
Plain	Vertical & Horizontal	Bi-Directional
Rotator	Vertical & Horizontal	Bi-Directional
Flapper	Vertical Flow Upward & Horizontal	Uni-Directional
Drip Tube	Vertical Flow Downward & Horizontal	Uni-Directional

⚠ WARNING

A sight flow indicator in service must be freed of all pressure or vacuum, allowed to reach ambient temperature and drained or purged of all fluids before re-torquing. Failure to follow this procedure could result in serious personal injury and property damage.

TORQUE SPECIFICATIONS (Ft-Lbs)

Rating Design	NPT Size	Neoprene, Buna-N, EPDM, Viton®	Gylon® 3504	Non- Asbestos, Graphite	Soft-Chem PTFE	Gylon® 3545
150 PSIG	1/2", 3/4"	12 - 16	20 - 25	15 - 20	20 - 25	20 - 25
	1"	13 - 17	20 - 25	28 - 32	20 - 25	40 - 45
	1-1/4", 1-1/2", 2"	20 - 25	55 - 60	55 - 60	77 - 82	N/A
ASME	1/2", 3/4"	20 - 25	26 - 30	27 - 30	40 - 45	26 - 30
	1"	20 - 25	26 - 30	30 - 35	26 - 30	N/A
	1-1/4", 1-1/2", 2"	25 - 30	70 - 75	60 - 65	82 - 87	N/A

IV. OPERATION

Before starting operation, check that all installation procedures have been completed. Use only qualified, experienced personnel who are familiar with sight flow indicator equipment and thoroughly understand the implications of the tables and all the instructions. Check that the retainers have been torqued to their proper limits as stated in the previous section. Check that all connections are pressure tight and the glass is clean and free of any damage.

⚠ WARNING

These units should be brought into service slowly to avoid excessive shock or stress on the glass. Rapid pressurization of a sight flow indicator can cause a glass failure and fluid leakage. Hydrostatically pressure test the Sight Flow Indicator to at least 50 PSIG and correct any leakage before proceeding.

V. MAINTENANCE

A maintenance schedule should be created for each Sight Flow Indicator installation. Regularly check the following items:

- Glass for cleanliness and signs of damage or wear
- Sight flow indicator for signs of leakage at gaskets or connections.
- Sight flow indicator for signs of internal or external corrosion.
- Retaining ring torque (see Page 2)

Maintenance Procedures

- 1. Glass** should be given regular and careful attention. Keep glass clean using a commercial glass cleaner and a soft cloth. Inspect the surface of the glass for any chips, scratches, pits, cracks, and/or bubbles. Glass that is even slightly damaged will focus any stress to the damaged area(s), and may break under pressure. Shining a light at an approximately 45° angle will aid in detecting some of these conditions. Typical damaged areas will glisten more brightly than the surrounding glass because the light is reflected. Detection of any damage, problem areas or surface wear is sufficient evidence to take the sight flow indicator out of service. DO NOT proceed with operation of the sight flow indicator until the glass has been replaced.
- 2. Gasket** leaks must be repaired immediately. DO NOT proceed with operation of a sight flow indicator until gaskets have been replaced.
- 3. Thread connection** leaks should be corrected by tightening the NPT connection, or by taking the sight flow indicator out of service and reapplying Teflon® tape to all male threads.
- 4. Corrosion** may occur if improper materials were selected for the Sight Flow Indicator application. It is the responsibility of the user to choose materials of construction compatible with the contained fluid and the surrounding environment. If internal and/or external corrosion are present, an investigation must immediately be performed by the user.

Disassembly

- Use a wrench with the spanner socket (P/N: 873-SOCKET) to loosen and remove the retaining ring.
- Remove the cushions, glass and gaskets from the unit body. Ensure that all of the gasket remnants have been carefully removed. If necessary, old gasket remnants can be gently scraped off with a soft metal scraper.
- Dispose of any old glass and gaskets.

⚠ WARNING

Do not remove the sight flow indicator while it is under pressure. Units in service must be freed of all pressure/vacuum, allowed to reach ambient temperature, and drained of all fluids before torquing, or personal injury may occur.

Reassembly

- Clean the body's gasket mating surface with a soft cloth and ensure it's free of debris.
- Inspect the replacement glass for imperfections. Prevent the glass from bumping or sliding against other surfaces, which could result in breakage, scratching or chipping.
- Place gasket, glass and cushion squarely into unit body. Ensure these are sitting completely flat within the cavity with no overlapping.
- Hand tighten and then torque retaining rings in accordance with the torquing specifications on Page 2.

⚠ WARNING

Do not reuse glass or gaskets from prior service under any circumstances. This can cause leaks or high stress points, potentially resulting in a glass failure, serious injury, and property damage.

Troubleshooting

Problem: *Leaking around main connections*

Potential Solutions:

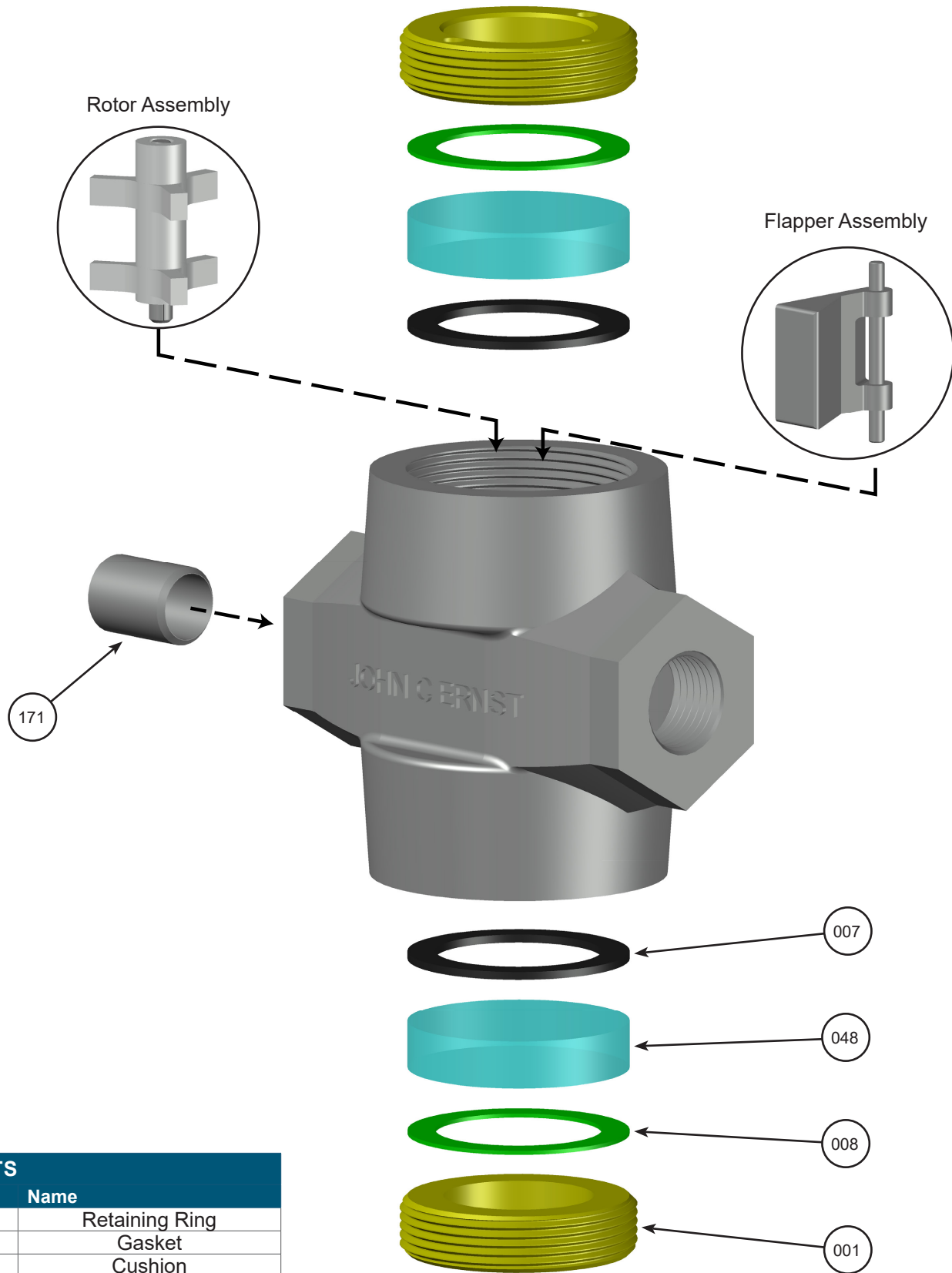
- Debris could reside in threads
- Insufficient Teflon® Tape applied during installation
- Unit cross-threaded into pipeline
- Damaged connection threads
- Existing threading not NPT (National Pipe Taper)

Problem: *Leaking around window(s)*

Potential Solutions:

- Verify the correct replacement parts have been ordered and received
- Retaining Ring may not have been torqued in accordance with the torque values on Page 2
- Glass and/or gasket may not have been seated properly within the unit body
- Glass and/or gasket incompatible with media

VI. SPARE PARTS INDEX



PARTS	
NO.	Name
001	Retaining Ring
007	Gasket
008	Cushion
009	Optional Shield (not shown)
048	Lens
171	Drip Tube

LIMITED WARRANTY

Period of Coverage

The John C. Ernst LLC. expressly warrants products to the original purchaser to be free from defects in the material and workmanship for 12 months from date of shipment. John C. Ernst LLC. will, at its option, replace or repair any products which fail during the warranty period due to defective material or workmanship. Evaluations, repairs, and replacements will most often occur in Sparta NJ 07871 USA, or another facility determined by the John C. Ernst LLC.. The warranty does not cover costs required to transport warranted units to or from the John C. Ernst facility.

Limitations

The responsibility of the John C. Ernst LLC. is hereunder limited to repairing or replacing the product at its expense. This warranty shall not apply if the product has been disassembled, tampered with, repaired, subjected to misuse, neglect, accident, or otherwise altered in any way. The warranty does not guarantee products against normal wear, glass breakage, clouding, or corrosion. The John C. Ernst LLC. shall not be liable for loss, shipping costs, damage, or expenses related directly or indirectly to the installation or use of its products. It is expressly understood that the John C. Ernst LLC. is not responsible for damage or injury caused to other products, buildings, personnel, citizens, or property by reason of the installation or use of its products.

Advertised ratings apply only to units serviced with parts supplied by the John C. Ernst LLC. Service must be done in accordance with the instructions of the product that is being serviced.

THIS IS JOHN C. ERNST, LLC'S. SOLE WARRANTY AND IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED WHICH ARE HEREBY EXCLUDED, INCLUDING IN PARTICULAR ALL WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. WE WILL NOT BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES OF ANY NATURE.

How to get Warranty Service

Prior to submitting any claim for warranty service, the owner must submit proof of purchase, and obtain written authorization to return the product. All returns must be sent back with an MSDS for the application that the product was used in, and with a maintenance log of all service including inspections. Thereafter, the product shall be returned to the John C. Ernst LLC. with freight paid and packaged to prevent damage in transit. Should damage in transit occur the John C. Ernst LLC. will not be held liable.

GENERAL PRESERVATION

Recommended Practice for Long Term Storage of John C. Ernst Products

1. All units should be inspected upon receipt to ensure that no damage has been incurred during transit. If there has been damage, a claim should be filed with the carrier immediately. Units should be stored in an area protected from the elements and corrosive fumes, in a secure manner where they can neither fall nor be struck by other objects. Care should be taken to protect the glass and the end connections from damage. Avoid placing any objects directly on the glass(es) at any time.
2. Units should be checked to ensure that they contain no foreign matter and that the end connections are clean, undamaged, and in line with adjoining piping. Examine each glass carefully using a flashlight for any indications of chips, scratches, blemishes or cloudiness. Inspect for scratches, shining a bright concentrated light (powerful flashlight will suffice) at about a 45° angle. Any scratch that glistens and catches a fingernail, or star or crescent-shaped mark that glistens, is cause for replacement. Process surface that appears cloudy or roughened, after cleaning, is evidence of chemical attack and is cause for replacement. If any type of flaw is apparent, the unit should not be installed until the glass and gaskets have been replaced. Follow the torquing recommendations given by the gasket and piping manufacturers to achieve proper sealing pressures.
3. Some products are shipped unassembled, as they are to be welded into position and then assembled. Individual pieces should be carefully stored in a manner to avoid damage until installation. The glass requires special attention. It should not be stored or mixed with objects that may cause damage and should remain wrapped or boxed until assembly.
4. Gaskets frequently assume a compression-set over a period of time. Some materials, however, may compress/relieve or creep. Visually inspect the gaskets for gaps or looseness before start-up. If the gaskets are not compressed, adjust the unit gasket compression. Do not tighten any fasteners or clamps while the unit is in operation.
5. Periodic visual inspection should be made to ensure that no leaks are evident and that there is no clouding, scratching, or blemishing of the glass. Keep glasses clean using commercial glass cleaners. Cleaning should be done without removing glass. This may require recirculation of cleaning material if process side of glass is not accessible. Never use harsh abrasives, wire brushes, metal scrapers, or anything that may scratch the glass. Do not attempt to clean glasses while equipment is in operation.
6. Should leaking around the glass occur, first check the glass for damage. If the glass appears to be in good condition, the gasket seal should be checked, but only after the system pressure has been brought down to zero. If the gasket appears to be loose, or hardly compressed, the spacers must be adjusted. If the leak persists after repressurizing, disassemble and replace the gaskets.
7. Glass, shields and gaskets that have been removed, **MUST BE REPLACED**. Used parts may contain hidden damage. Induced stress in glass and de-tempering are **NOT** visible to the naked eye. Be sure that the replacement glass is proper for the service.
8. Inspect protective coating (if applied) for chipping.
9. Store within the temperature extremes of the nameplate or specification documents – do not expose to direct sunlight or other UV sources.
10. Products should be stored off of the floor on suitable skids, pallets, or racks and protected from dirt, debris, and exposure to direct sunlight, particularly to soft sealing surfaces.
11. Store in a cool dry place, room temperatures between 40°F - 80°F with a relative humidity level between 40 – 75%.
12. Store in dry areas, avoiding any contamination with any liquids. Products should be kept in a clean, heated, weather-tight (dry), well ventilated facility.
13. If a flanged product is to be stored for any extended period of time, the flange or end protector should be examined to ensure they are fastened securely, and any other open areas should be sealed to prevent any moisture damage.
14. Product assemblies with electrical components, pneumatic tubing, positioners, actuators, and other accessories should be protected from impact.
15. Useful Life When Stored:
 - a. Unit: Indefinite, based on ideal storage conditions.
 - b. Spare Gaskets: Indefinite, based on ideal storage conditions.
 - c. After 9 months, the torque of the bolting should be checked as the gasket relaxes. This should be done for units not in service as well as those installed in process.
 - d. The useful life of the material, when the storage conditions differ from the recommended factors is not known. It has been established, however, that room temperature has a significant influence on the shelf life of material.
 - e. Spare Gaskets should be stored flat.
16. Periodical checks at least every 6 months have to be carried out in the storage area to verify that the above mentioned conditions are maintained.

If there are any questions or concerns, please contact the John C. Ernst LLC. Sales Office at 888-943-5000.

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